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28 June 1984

West Europe Report

SCIENCE AND TECHNOLOGY

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WEST EUROPE REPORT

SCIENCE AND TECHNOLOGY

CONTENTS

AEROSPACE

ESA: 80 MILLION ECU'S TO STUDY PARTICIPATION IN U.S. STATION

Paris AFP SCIENCES in French 17 May 84 pp 26, 27

[Text] Paris--The European Space Agency (ESA) will be deciding at its council meeting on 27 and 28 June to earmark 30 million ECU's over the next 2 years for detailed studies on its possible participation in the future American orbital station, according to a reliable source.

The ESA council meeting held at ESTEC in Noordwijk, following the ceremonies of the twentieth anniversary of the European space program, did not reach final conclusion on a joint European response to the proposal to participate in the United States' major new space project.

For the June council meeting, ESA experts are supposed to draw up a detailed research proposal spelling out what ESA might contribute to the American project, directly or indirectly. If this proposal is adopted, the study, valued at 80 million ECU's, should be completed by the end of 1985. The ESA would then be in a position to make a final decision on its participation, as more information will be available on the American project by October of that year.

This proposal should take into account the German-Italian project for the "Columbus" inhabitable module, which the delegations of those two countries presented in detail at Noordwijk.

Up to now the ESA has shown a "polite interest" in the American space project, and Agency circles do not know how the European countries represented at the London summit of heads of state and government, to take place on 7, 8 and 9 June, will react, or if they will do so. "Everything could be decided in the offices of these political leaders." The ESA, for its part, will not have to take a stand on this subject on the occasion of the meeting.

If a decision is made to grant the money for these studies, as expected, this will show how seriously the ESA takes the American proposal, the same source added.

9805
CSO: 3698/466

BRIEFS

SPOT RECEIVING STATION DELIVERED--The National Center for Space Studies (CNES) and the European Propulsion Company (SEP) have delivered the Space Image Receiving Station (SRIS) at Issus-Aussaguel (Haute Garonne), near the Toulouse Space Center. This station is part of a whole range of equipment used by CNES to observe earth from space and conduct operations. The image recorded on board the satellite is transmitted by radioelectric waves to stations such as the one developed by SEP for CNES. These images must then be treated to obtain cartographic documents. This is the job of the Space Image Rectification Center (CRIS) being set up in the Toulouse Space Center, which will be a true image production unit. These documents are then marketed by the Spot Image Company. The Space Image Receiving Station (SRIS) will numerically record the image data transmitted on an 8 GHz frequency band by the Spot satellite. The SRIS and the CRIS were developed by the highly skilled Image Treatment Division of SEP for an amount over 130 million francs. To develop the SRIS, the SEP has been working in conjunction with Starec [Technical Company of Electronic Research and Application], CSEE [Electrical Enterprises and Signals Company], BTMC (Belgium), SNEC, Intertechnique, LCT [Central Telecommunications Laboratory] and Enertec. [Text] [Paris INTER ELECTRONIQU' _n French 26 Mar 84 p 42] 9805

CSO: 3698/466

BRIEFS

FRG-JAPAN JOINT VENTURE--Robert Bosch Inc in Stuttgart and Nippon Air Brake Co Ltd (Nabco) in Kobe last week signed an agreement for establishing a joint Japanese company for developing, manufacturing and marketing anti-blocking systems (ABS). According to a press statement issued by the company in Stuttgart, Bosch will hold 35 percent and Nabco 65 percent of the shares in the joint company Nippon ABS Ltd in Tokyo. The start-up capital of the company--scheduled to begin operations on 1 June 1984--is 1 billion yen or approximately DM 10 million, says a spokesperson for the firm. The purpose of this joint venture is started to be a joint development of the Japanese market for Bosch's ABS systems. It was also reported that Bosch granted Nabco license rights for the Bosch ABS as early as 1973. In the joint undertaking, Nabco will make available its existing ABS production, including staff and facilities, and Bosch will furnish its production and development know-how. Bosch's activities in Japan will receive a new impulse from the cooperative venture. 1983 sales of the Bosch group in Japan totaled approximately DM 70 million. In addition to the license grant for automotive equipment to around 23 enterprises in the fields of mechanical and electronic fuel-enjection systems for diesel and Otto carburetor engines, Bosch is represented in the fields of automotive equipment, electric power tools and household appliances also with its own marketing company, Robert Bosch Ltd. with 190 employees. [Text] [Duesseldorf VDI NACHRICHTEN in German 4 May 84 p 7] 9992

CSO: 3698/445

FRENCH REINFORCE LINKS TO AMERICAN BIOTECH

Paris L'USINE NOUVELLE in French 24 May 84 pp 28-29

[Article by Philippe Dutertre]

> [Text] In the midst of change, U.S. biotechnology firms offer abundant opportunities for the French. To negotiate the difficult switch into industrialization, they need partners.

Their appetites whetted by the size of the coveted markets and the prospect of big dividends, French industrialists involved in biotechnology are stepping up their offers of help for young American biotechnology firms, some of which did not even exist 3 years ago.

There is good reason for excitement at the prospects concerning markets to be conquered: $20 billion in 1990 for genetically engineered therapeutic products and another $10 billion by 1995. Human insulin alone (used in the treatment of diabetes) represents a market of $345 million for next year.

Ties exist, and it is important to strengthen them. This is all the more true in that thanks to the effectiveness of venture capital, the resources being deployed around the universities in Berkeley and Davis and at Stanford are incomparably greater than those available to French researchers. Cetus, which is working on beta interferon, interleukin-2, and immunotoxins, has an impressive cushion of cash in the bank: $90 million. Its product sales, however, brought in only $500,000 in 1983.

The introduction on the stock market of about 20 genetic engineering research firms has made it possible to raise $500 million over the past 2 years. But the euphoria of the years from 1975 to 1980 has now faded. Investors are showing impatience, and promises that products will soon appear on the market and quickly become profitable no longer reassure them. The firms' profits from their financial earnings can no longer mask the absence of convincing commercial profits. Stock prices have fallen by 40 percent. Few new firms are being established (only three last year, compared to 43 in 1981).

Major Companies Invest in Their Own Research

Moreover, biotechnology requires a burdensome investment, and the firms are being forced to nibble away at their initial capital. Cetus, for example, consumed 12 percent of its capital in 1981 to finance its research. The major U.S. companies themselves are turning away from small firms to invest in their own research. The result is that biotechnology firms are having to conclude new alliances, and the French are forming a line. Research contracts, cooperation agreements, and direct investment in the form of risk capital constitute the panoply of weapons being used by aspiring partners.

French industrialists are interested basically in three areas: pharmaceutical products, the food processing industry, and plant health. Pharmaceuticals, which have shown the most promise of profitability, have been the favorite field of action for the first of the U.S. biotechnology firms. Research has been centered mainly on the fight against cancer (interferon, interleukin-2, and immunotoxins), diabetes treatment (human insulin), and diagnostic tests (monoclonal antibodies).

Roussel-Uclaf, whose principal stockholders are Hoechst (54.4 percent) and the French Government (40 percent), is already working with Cetus to develop vitamin B12 by means of genetic engineering. Linked by research contract to the French company of Transgene, it is following with interest the work on interferon that is being done by Cetus and Chiron. Is this its way of trying to match the Biogen-Schering Plough alliance? Probably. Alain Madec, Roussel-Uclaf's general manager, is also contemplating backing the transition to industrialization by Genex, which specializes in the production of enzymes and amino acids through genetic engineering. The successes achieved last year by its two star products--Decis (an insecticide) and Claforan (an antibiotic)--confirmed its mastery of marketing techniques.

The work done on interleukin-2 by Cetus and Chiron may also attract cooperation by Roussel-Uclaf, SANOFI, and Rhone-Poulenc. In the field of fermentation, Rhone-Poulenc, the European leader, may participate in the effort by U.S. biotechnology firms anxious to overtake the lead lost to the Japanese. The French chemical group recently signed a research agreement with Seedtec, a subsidiary of the Kay Corporation, which is a U.S. oilseed group. Attention should also be drawn to the partnership between Elf Bio Industries and Engenics (fermentation of lactic acid), which is a model of cooperation between a university and industry.

Stronger Ties More Necessary Than Ever

In the food processing industry, the breakthrough by the Lafarge-Coppee group, acting through Orsan, has just materialized through the purchase in May of Wilson Hybrids, which specializes in the genetic improvement of seed. Lafarge also has a privileged observation post in Agritec, a fund which was set up for investment in the United States and in which the group headed by Olivier Lecerf is in partnership with the Agricultural Credit Bank and Elf.

French initiatives are increasing on the financial level. Risk capital--previously considered a typically American oddity--is beginning to be taken seriously by French investors. Long associated with the Bank of America in San Francisco, the Financial Company (of the Edmond de Rothschild group) is out in front by a good length. Last year it set up a GIE [intercompany management syndicate] to invest risk capital in high-tech firms in the United States. The group has five members: MATRA [Mechanics, Aviation, and Traction Company], Renault, Roussel-Uclaf, Bull, and Cisi. The objective is to facilitate the transfer of high technology to France. In 1983, 350 dossiers on U.S. firms were presented to the GIE's members with proposals that they acquire an interest in those firms or enter into licensing contracts.

The attention of French investors is currently on partnership contracts for biotech R&D (R&D partnerships) that should lead to profitable products within 2 years.

The strengthening of the link between the United States and France in the field of biotechnology is more necessary than ever. For the U.S. firms, which are facing profitability problems, it is a matter of putting their development on a more solid foundation. For the French, the stakes are even bigger: it is a matter of attaining both international size and international competitiveness.

[Insert] U.S.: General Mobilization

New York stockbrokers will long remember 14 October 1980. On that day, a California businessman named Robert Swanson sold 1 million shares of Genentech on Wall Street at $88 each. He was expecting only $35!

All the new genetic engineering research firms were to experience the same great popularity with investors when they were established. In 1980, 26 companies were formed. In 1981 the number was 43. Their special characteristics: a research project, a cushion of dollars for the initial investments, and no short-term profitability. Their founders were university people launched into the industrial battle by professionals in the field of risk capital. In 1984, there are 220 firms of that type. The major industrial groups did not wait for the boom in the years from 1975 to 1980 to develop biotechnology research of their own. Three industries are involved: the chemical industry (Dupont de Nemours, Dow Chemical, and others), the pharmaceutical industry (Johnson and Johnson, Searle, and others), and the petroleum industry (Exxon, Mobil, and others). Contrary to the general impression, the Federal Government participates, although indirectly, in the development of biotechnology, electronics, and data processing in the United States. Research contracts have been signed by private firms with the National Institute of Health (NIH), the Department of Agriculture, and the National Science Foundation.

11798
CSO: 3698/461

FRANCE: UNIVERSITY PARIS VII-INDUSTRY TIES GROWING

Paris BIO LA LETTRE DES BIOTECHNOLOGIES in French Apr 84 pp 4-5

[Text] A technology development group whose bylaws are currently being worked out should see the light of day at University Paris VII before the end of this year.

Over 800 researchers work in the university's 200 laboratories. Most of the current research projects are directly connected with industry.

This is especially true of the biomedical sector, which has long been subsidized by the pharmaceutical industry.

Among other reasons, a development group is being established for the following purposes:

1. To meet the need to strengthen the synergism which may exist among the various research programs and laboratories.

2. To make the university aware of its responsibility to the industrialists involved financially in those programs.

3. To define more closely the needs of industrialists, including small and medium-sized businesses and industries, and the potential represented by the research carried on within the university, while also making those needs and that potential better known and promoting research agreements.

4. To develop certain applied research programs directly.

5. To promote the development of multidisciplinary programs.

The group will act as a service firm by providing reference material, feasibility studies, research under contract, and the design and execution of projects, but without going beyond the prototype stage.

It should bring investors and industrialists together around representatives of the university. Several investors and industrialists have already applied.

A laboratory oriented toward technology transfer might be established alongside this new group to permit direct reinvestment in applied research.

A multidisciplinary research project in biotechnology that combines the skills of biologists, enzymologists, chemists, electronics engineers, and computer experts has been set up as part of the development of this new group.

University Paris VII is currently working on over 50 projects dealing with biotechnology (vectors of expression, biodegradable pesticides, new methods of cellular expression, molecular plant biology, sensors, the application of bioluminescence reactions to the latter, techniques for evaluating biomass without the need for phase separation, and so on). Such firms as the BSN, Novelis, Elf-Aquitaine, Roussel Uclaf, and SANOFI have direct contracts with academics in those areas.

The biotechnology projects concern the pharmaceutical industry in particular, but a clear orientation toward the food processing industry is taking place through research as well as through specific teaching programs (management of a food chain, a course in food science, the establishment of a training course for fermentation technicians and protein chemists, and so on).

Talks are underway with the Ministry of Agriculture for the establishment of a reference laboratory, European in scope, that will be responsible for controlling the quality of foodstuffs and, taking into account the existing data processing resources, the setting up of a data bank in this field.

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11798
CSO: 3698/461

GERMAN RESEARCH ON BETA-INTERFERON

Duesseldorf VDI NACHRICHTEN in German 4 May 84 p 1

[Text] The latest reports from the GBF (Biotechnology Research Society) in Braunschweig-Stockheim prove that German gene-engineering research need not shy away from international comparison. There it was possible in March to produce human beta-interferon from mouse cells. In the meantime, researchers there have also been successful in making a beta-interferon gene artifically from 517 building blocks.

Scientists at the Biotechnology Research Society, Ltd., in Braunschweig, in mid-April were successful in making a beta-interferon gene artificially. This gene has a length of 517 base pairs. The term "bases" is used in referring to the small building blocks that constitutes the germ plasm (DNA). Helmut Bloecker, Ronald Frank, and their colleagues in the DNA synthesis team made one of the longest synthetic genes in this process. The goal of these activities was not to establish a synthesis record but rather to make genetic information for making beta-interferon "more efficient" than the original gene from the human germ plasm.

They were able to do this in an extremely short time with the "filter method" developed at GBF. International development in the field of DNA synthesis facilitates the availability of artifical genes more and more quickly and leads to the increasing use of these genes in gene-engineering. The success of the scientists in Braunschweig underscores the national significance of the work of GBF in this field.

A method for producing human beta-interferon from mouse cells had been developed by GBF several weeks before. Proteins found in the body (albumens) with a pharmachological effect play an important role in medical research and practical application. Procurement from body tissue or blood, however, is not possible to an adequate extent because these substances are present in extremely small concentrations. Interferons are distinguished by the protective effect they have upon human cells against viruses. At the same time they also inhibit growth on tissue culture cells, especially tumor cells.

The prerequisite for the production of beta-interferon was the isolation of the corresponding gene from human cells. By means of "genetic engineering" it was possible to alter the gene in such a way that human beta-interferon was produced in special mouse cells.

The cells grow in a cheap medium which is ideal for production and in which the interferon is given off. In this way it is possible to make large quantities of human interferon from mouse cells. For the clinical use of beta-interferon from human fibroblasts we need only partial purification which can be achieved with the processing method developed by GBF with a very high yield. Interferons from transformed cells on the other hand must be purified all the way to homogeneity; in order not to lose the advantages of such production methods, it is necessary to achieve hitherto unattained yields also in the processing of cloned interferons. For the purpose of processing and purifying the interferon from mouse cells, methods developed by GBF are being used on the basis of aqueous two-phase systems. The prerequisites for a scale-up of the entire processing method were created with the introduction of high-pressure liquid chromatography (HPLC) of interferon-beta on an analytical scale and a protein detection system which is necessary for this with a detection system of less than 1 billionth gram of protein.

5058
CSO: 3698/457

GERMANY: GENETIC RESEARCH IN MUNICH

Munich SUEDDEUTSCHE ZEITUNG in German 9 May 84 p 6

[Article by Martin Urban]

[Excerpts] Munich, 8 May--A time of "wealth of novel possibilities," in which the resources of nature would no longer be "overutilized" but in which only the human intellect would be used was praised by Federal Research Minister Heinz Riesenhuber (CDU [Christian Democratic Union]) on the occasion of the opening of the new gene-engineering center in Munich. Bavarian Minister President Franz Josef Strauss (CSU [Christian Social Union]) also spoke about the "tremendous prospects" that are connected especially with modern molecular biology.

Riesenhuber believes that the concept of cooperation between the university, the Max-Planck Society and chemical industry, which was developed in Munich, offers a great opportunity: Science and industry could reorganize themselves simultaneously, the economy could understand scientific discoveries and developments already during the development process itself (by the way, an additional three gene-engineering centers are being established in the FRG).

The center, which is to be located temporarily in the Max Planck Institute for Biochemistry in Martinsried and which is to be settled later on in downtown Munich, will get about DM6 million per year over the next seven or eight years (including 4.4 million from the Federal Research Ministry, 1 million from Hoechst, DM200,000 from the Wacker-Chemie Company, and initially DM250,000 from the Free State of Bavaria).

As Ernst-Ludwig Winnacker, the organizer at the University of Munich, said, industry--even though it may not be financially committed) may send staff members to the center, but without any exclusive rights and only in case of a free flow of information. Winnacker stressed that gene-engineering intends "not to go certain routes and not to overstep the corresponding boundaries." This includes renunciation of "manipulations of human germ path cells and experiments with cloning humans."

"Not Without Animal Experiments"

The Federal Research Minister believes that a new law, which sets limits for gene-engineering development is "wrong." Max Planck Society President Reimar Luest emphasized that science is taking its responsibility seriously. But it must be said quite publicly that "gene-engineering cannot be pursued without animal experiments." The administration's draft of an animal protection law amendment, in an appendix, contains "legal incitement for dishonesty among scientists." Bonn supposedly is entirely too ready to yield to emotional influences instead of looking for objective solutions.

5058
CSO: 3698/457

BRIEFS

SPD SEEKS RESEARCH CONTROLS--The opposition in the Lower House has petitioned for the establishment of an investigating committee on gene engineering. The Greens want a general stop of gene-engineering experiments with just a few exceptions to be spelled out on a clearance list. The SPD [Social Democratic Party of Germany] is concerned with illustrating both the opportunities and the risks and getting a handle on the social consequences at the right time. The committee, which is to be made up of seven deputees and six outside experts, is to investigate goal conflicts between the freedom of research and other basic rights, but above all it is supposed to draft criteria to determine where the limits for the application of new biological methods to human cells and man are to be found on the whole. Besides, it is to point up criteria and recommendations for guidelines and safety standards in the industrial use of gene-engineering methods. According to the ideas of the SPD, the competence of the Central Biological Safety Committee is to be enlarged and the controls over gene research are to be separated from the promoting Research Ministry. The CDU/CSU [Christian Democratic Union--Christian Social Union] expressed the fear in its initial comment that this kind of investigating committee would talk the opportunities of gene-engineering to death. [Text] [Duesseldorf VDI NACHRICHTEN in German 11 May 84 p 1] 5058

CSO: 3698/457

CIVIL AVIATION

FRG'S MBB PREPARES FOR FURTHER EXPANSION

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 22 May 84 p 16

[Unsigned Article: "'Think Tank' To Be Utilized More Extensively For Own Production"]

[Text] Messerschmitt-Boelkow-Blohm GmbH (MBB), Munich-Ottobrunn. The chairman of the board, Dr. Hanns-Arnt Vogels, informed the International Air Fair that the company was still in a phase of consistently tightening its position as an authority in the field. Yet, preparations are under way for a new phase of expansion. This period of new growth is to be initiated after 1987-88. But MBB is already establishing and expanding its presence in those major markets of international trade believed to be most promising. Thus Vogels reported that their own office is being set up in Peking. A new company has been formed under the name of "Neue Transporttechnologien" [New Transportation Technologies] together with the Indonesian aircraft manufacturer Nurtanio, which initially is to develop a small helicopter and a small training plane.

Vogels' comments implied that in the future MBB will utilize the output of the "think-tank"--as the company has been regarded for many years--to strengthen its own production, thereby increasing its own net product. The research and development effort in 1983, nevertheless, constituted about 17 percent of sales which had increased from DM 5.6 million to DM 5.9 billion.

MBB's intensive collaboration with aircraft manufacturers of other countries is not limited to the construction of the European passenger airplane, the Airbus, but also includes development and production of military aircraft. Using models, MBB exhibited for the first time three versions of the next generation of antitank helicopters at the International Air Fair. These models are the PAH-2 for the Federal Armed Forces, the HAP combat support helicopter and the HAC-3G antitank helicopter for the French army.

Vogels warns, however, that the priority of the "key air and space industry" must be reassessed in view of the depleted state of public coffers. The advances of microelectronics, biotechnology, information and environmental technologies, make it increasingly difficult for the air industry to allocate the funds needed for its traditional tasks. Moreover, an obviously keener competition can be observed within the domestic air and space industry.

12628
CSO: 3698/454

CIVIL AVIATION

FOKKER GETS 800 MILLION GUILDER GOVERNMENT LOAN

Amsterdam DE TELEGRAAF in Dutch 13 Mar 84 p 7

[Text] Amsterdam, Tuesday--The cabinet has decided to back Fokker with hundreds of millions of guilders in the further development of two greatly improved successors to the F-27 and F-28 airliners.

Minister Aardenne of Economic Affairs announced this yesterday in an interview with TROS [Television-Radio Broadcasting Corporation] radio. He conceded in the conversation that it was a matter of a sum of roughly 800 million guilders. A Fokker spokesman was not able to confirm this figure, as the official pledge has not yet reached Fokker.

The Fokker management had already decided to build these planes last fall and had asked the government for a development credit of one billion guilders. According to the spokesman, Fokker will also have to bear a portion of the development costs itself.

Favorable

It is a matter of the Fokker-50 and Fokker-100 airplanes. The preliminary studies on the construction programs were finished up in November 1983. According to the Fokker spokesman, the sales situation for these new planes is such that they expect to be able to conclude sales contracts for both the new models in course of the current year. In addition, there has been intensive contact with a number of airline companies all over the world. Sales results are also one of the conditions for the further implementation of the development program.

According to the agreement between the government and Fokker, the money will be stretched out over a series of years. Part of it consists of loans and part of the money will be chargeable to the budget. The plan is that the loans will be repaid in the form of royalties on the airplanes sold, as was the case with the F-27 and the F-28.

Budget

The royalties to the state will continue even after the full amount of development credit furnished by the state has been repaid. With the F-27

production that started at the end of the fifties, one is now at the point where the development credit of the time has been repaid three or four times over, according to the Fokker spokesman. These funds go into a so-called "rotating fund", a budget that is specifically earmarked for the development of new types of airplanes. With the F-28, Fokker hopes, in the course of this year, to reach the stage where the development costs will have been repaid to the state. The sale of F-28s will then start to contribute to Fokker's profits.

Moreover, the support for Fokker had already been under consideration for a long time. The firm was able to count on hundred of millions in governmental support while they were still negotiating with the American McDonnell Douglas on the joint construction of a 100-passenger plane, the MDF-100.

At a very late stage, however, Fokker decided to withdraw from further development of that project in view of the badly flagging airline market and the further low feasibility of the MDF-100 project. Fokker then decided to start working independently on the new versions of the F-27 and F-28. The cabinet then made it known that they would reserve the remaining funds from the MDF-100 project for Fokker's new projects.

12507
CSO: 3698/441

COMPUTERS

BUSINESS RESULTS FOR 1983 OF FRANCE'S BULL

Paris ZERO UN INFORMATIQUE HEBDO in French 26 Mar 84 p 40

[Article by Gerard Schmitt]

> [Text] As its executives intimated last September, 1983, losses of the Bull group were reduced to half of what they were the previous year. Hence, the deficit of CII-HB alone amounted to 596 million francs, as compared to 1.351 billion francs in 1982. For the new group this time, the accounts show a net consolidated loss of 625 million francs, for total revenue of 11.64 billion francs, an advance in comparable terms of 21.3 percent. In commenting on the business in 1983 and their financial results, Jacques Stern and Francis Lorentz, president and managing director, respectively, estimated that the improvements made place it slightly ahead of the recovery plan which is supposed to bring the group back to financial equilibrium by 1986.

According to Francis Lorentz, once the operating contract with the government was signed at the end of February and the take-over of Sems and Transac completed, the group's efforts in 1983 focused on three areas:

--Stepped-up development of distributed data processing and of office automation, with a line of products (work stations), the initial examples of which will be officially announced at the end of 1984.

--Cooperation with other manufacturers in Europe or elsewhere in the world so as to offer users a credible alternative to Number One (participation in Esprit and EIES programs, establishment of a joint research center with ICL and Siemens, specific agreements with Honeywell, Convergent Technologies, Trilogy, Vertex and Matra-Harris, and the recent European agreement to standardize disparate networks).

--Improvement of the group's economic and financial status, by means of decentralized, structural reorganization and renewal of its plant and equipment and commercial apparatus.

What are the results of all these efforts? Consolidated revenue jumped to 11.64 billion francs, up 21.3 percent over comparable revenue of last year, with consolidated losses at 625 million francs. The revenue of CII-HB alone increased by 22.5 percent, and its losses were reduced from 1.351 billion francs in 1982 to 596 million last year.

An 800 Million Franc Gain in a Single Year

Export proceeds, which account for 38 percent of consolidated revenue, increased by 18 percent. Sales by Bull to HIS (Honeywell Information System) increased to 350 million francs, and purchases to 500 million francs.

Other figures are even more significant: the gross profit margin improved by three points, operating costs were reduced by two points, and interest payable now accounts for 7.2 percent of the group's revenue, as compared with 9.5 percent for the previous fiscal year. The cash flow, 500 million francs in the red in 1982, moved to a positive position of 280 million francs in 1983. As Francis Lorentz noted, "we have therefore realized a gain of nearly 800 million francs from one year to the next." He further specified that industrial investments amounted to 650 million francs, investments in rental property to 850 million francs, and research and development to 1.3 billion francs.

What are the goals for 1984? Bull's managing director defined them as follows:

--A focus on the quality of the service offered to users ("in 2 years, out entire staff will be trained in the quality standards of all facets of our business").

--Continued development of a whole line of computer and office automation products, and a revival of the DPS 7 line, with an announcement by the end of 1986 of a brand new generation of equipment.

--A new strategy for attacking international markets and a reorganization of the forces which are now scattered throughout the United States under the banner of the Bull Corporation of America.

While freely admitting to be only "a relatively small-sized computer firm on a worldwide scale," the group seems finally to have a grasp of its strengths and weaknesses. "These significant improvements are only a first step," Francis Lorentz said, adding that "we are well aware that to catch up, the road ahead will be long and difficult."

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CSO: 3698/466

BRIEFS

FRENCH-TUNISIAN SOFTWARE ACCORD--Tunis--It was learned on 17 May that high-level, exploratory contacts were made in Tunis in the past few days, with a view to setting up joint Franco-Tunisian computer software teams. This project was the focal point of several talks between Bernard Dorleac, president of Thomson-CDF subsidiaries specializing in computer software, and Habib Bourguiba, Jr., the son of the Tunisian head of state and his special advisor, Rachid Sfar, minister of economy, and Mohamed Frej Chadli, minister of national education. The software to be thus developed, and particularly software in the Arabic language, could be jointly exported to other Arab countries. During his visit to Tunis, Mr Dorleac also met with Tunisian computer users, presidents of Tunisian and Arab banks and the heads of the National Data Processing Center. [Text] [Paris AFP SCIENCES in French 17 May 84 p 43] 9805

CSO: 3698/466

STUDY REVEALS NUMBER, TYPES OF ROBOTS USED IN FRG IN 1983

Number of Robots Increases

Landsberg PRODUKTION in German 5 Jan 84 p 1

/Text/ In 1983, the "robot family" increased by 1300 units. Thus 4,800 robots are now busy in German production enterprises, where 1100 robots are providing service at VW alone. The area of spot-welding has 1,560 applications and represents the largest absolute number; the largest relative growth rate, however, was accounted for in the assembly area: 100 percent.

The number of robots used in Germany rose in 1983 from 3,500 to 4,800 in December 1983. This is indeed the largest increase that has been recorded so far, but it does not yet correspond to the sometimes very euphoric market forecasts. The euphoria seems to have lost its steam: Out of the 83 inquiries of the Fraunhofer Institute for Production Engineering and Automation (IPA), only about 10 percent were answered in writing. If the IPA had not followed up, the report at the end would not have been possible.

As in every year, the robot application areas are subdivided into the areas of tool handling and workpiece handling. Only the robots that are installed in West German enterprises by the end of December 1983 are counted. The total number of robots used is 4,800, 1300 units more than last year. There is an increase in nearly all application areas, but the increase in individual areas was sometimes quite different.

If one considers the individual areas in more detail, one observes that spot-welding has the absolute highest number of 1,560 and, now as before, is the largest user of robots. But the relative increase was no longer as great as in the previous year. The use of spot-welding robots was concentrated almost exclusively within the automobile industry, where the robots from VW in the VW plants and the robots from Kuka and Azea are used most frequently.

The use of robots for deburring and dressing must be regarded as a problem child in areas which are now opened up by robots. Despite intensive development and the clear urgent necessity of using robots in this application, even under the perspective of humanization, the increase of the number used is very modest. The strongest relative increase, namely more than a doubling, is observed in the use area of assembly. This doubling is naturally relatively easy

as long as the absolute numbers are still small. However, this increase of assembly robots has been expected for years and was observed only on a very modest scope in the years 1982/83. The doubling of assembly robot applications indicates that assembly robot technology has now made the jump expected for 1982. About a year ago, it also became clearly recognizable on the market that there now was a supply of appropriate units for automating assembly activities. Two or three years ago, this was the case only to a very limited extent. But even with this doubling of assembly robot applications, the use of robots in assembly remains far behind euphoric expectations. The problems in the area of assembly automation lie in the necessary peripherals. These problems must be solved case-by-case, so that an explosive development in the area of assembly robots can also be excluded.

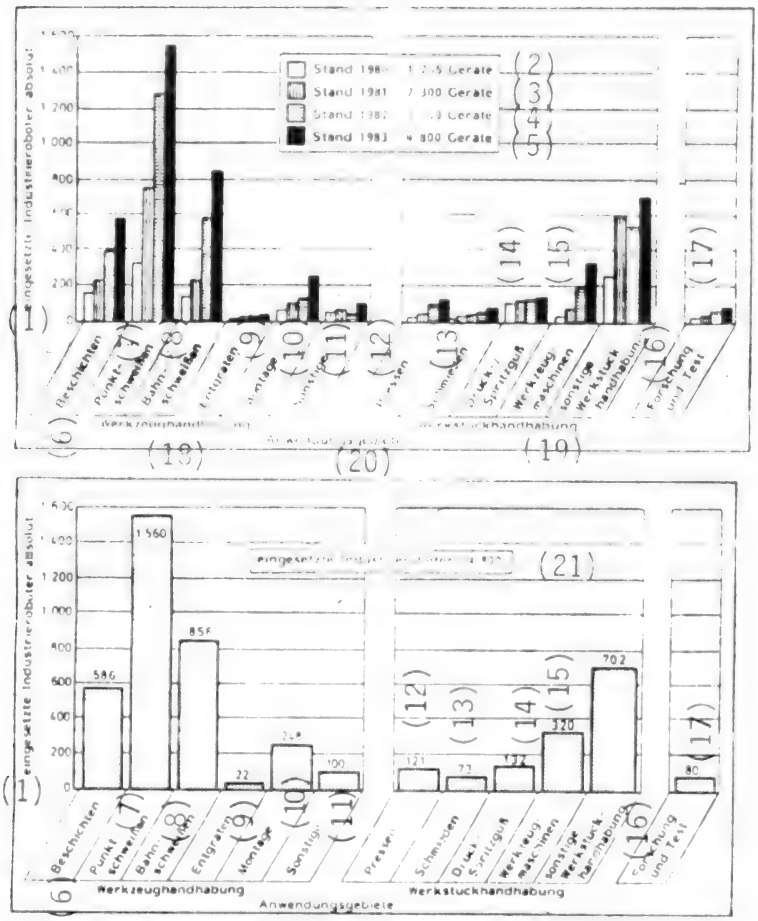
Details on Types of Robots

Landsberg PRODUKTION in German 19 Jan 84 pp 3-4

/Excerpts/ In recent years, constant increase has been observed in the use of robots for coating. This increase was also observed in 1983. The robots involved in coating now belong to the state of the art and are marketed almost exclusively by the manufacturers of paint and coating systems. They use these units properly in connection with the coating task. Besides the familiar application areas involving coatings, such as the painting of housings, underfloor protection, and enameling, robots are also increasingly being used for applying adhesives by spraying. The coating robots, now as before, are all driven hydraulically. Designs which existed more than a year ago with an electrically driven Italian unit up to now have not been seen on the market, at least in Germany.

Already in 1982, a very strong expansion could be seen in the area of seam welding, and this is based on a further improvement of robot engineering, especially better track control. This makes the robot excellently suited for arc welding. The supply in this area comprises a dozen units. As in no other use area, there was a demand for sensors in the area of arc welding. The growth from 260 robots in the area of seam welding, corresponding to an increase of more than 40 percent, was possible even without a major use of sensors, however. In this area there are indeed still some experiments at the present time which are also running quite successfully, but it turns out that, even without sensor technology, a technically economical and meaningful automation of the arc-welding process is possible.

In the area of assembly automation, the experts consider Hall 54 at VW, for the production of the new VW-Golf, a milestone the like of which is not to be found anywhere in the world. In this Hall 54, robots are used not only for the automated pre-assembly equipment for engine-transmission-steering, but also in the final assembly of the body. In the preliminary assembly, the robots mount additional equipment such as a starter, alternator, consoles and supports onto the basic engine. In the final assembly, robots automatically insert batteries. Even the clamps for fastening the batteries are screwed on



Statistics Make It Manifest

The real numbers for robot deployment lag behind most euphoric forecasts. According to the status as of December 1983, the largest growth up to now has been recorded, which in actual numbers, however, makes up only 1300 units.

Key:

1. Absolute number of deployed industrial robots
2. Status as of 1980 1,255 units
3. Status as of 1981 2,300 units
4. Status as of 1982 3,500 units
5. Status as of 1983 4,800 units
6. Coating
7. Spot-welding
8. Seam welding
9. Deburring
10. Assembly
11. Other
12. Pressing
13. Forging
14. Compression/injection molding
15. Machine tools
16. Other workpiece handling
17. Research and testing
18. Tool handling
19. Workpiece handling
20. Application area
21. Industrial robots deployed: 4,800

automatically, and robots undertake the automatic assembly of the fuel tank and the installation of the completely pre-assembled exhaust system.

The objective at VW was to build a comparative production system in a high-wage country such as Germany, at the highest quality level. But not only automation was the objective but also humanization. For example, strenuous overhead work is obviated by this new type of assembly. This brave step on the part of VW shows that the limits of the capabilities inherent in robots have up to now still be underestimated.

The area of other machines and handling includes all robot uses which load and unload machines, such as measurement or testing machines, and robot uses for palletizing and chaining tasks. The number of robots used in research and testing has also risen. This shows that the area of robot research and development is actively being pursued in the Federal Republic of Germany.

The robots are mainly situated in manufacturing companies and among large robot users, but also are in the research and development laboratories of colleges and universities. Twenty robots are situated just in the laboratories of the IPA, available for various testing purposes.

Worldwide, work is being done on the further development of sensor technology. Robot controls are being developed which can process sensor signals, so that additional application areas are opened up. If one furthermore considers humanizing perspectives, the improvement of working conditions, one can expect that robots will find their place in production just as naturally as NC machine tools. The problems which arise from the word robot and the associated discussion of job displacement are not justified by the relatively small number of 4,800 robots. When 2.5 million jobs are lacking, one cannot make 4,800 robots responsible for this. Perhaps, even the opposite is true, since some robot manufacturers can point to an export which lies between 30 and 50 percent. Thus, the number of robots that were exported from Germany in 1983 lies between 800 and 900.

It is true, however, that 40 percent of the robots used in the Federal Republic were imported. This includes 32 percent from the Scandinavian countries and the USA and only 8 percent from Japan. Now as before, one observes an increasing trend of robots from Japan.

The robot market is certainly a growth market, where new manufacturers are constantly arriving with new devices. The market supply at this time comprises about 200 different types, which are offered by 80 companies in the Federal Republic. This number is important if one considers that the three largest manufacturers and distributors in the Federal Republic already cover 50 percent of the market. If one considers the first dozen manufacturers and suppliers in the Federal Republic, one observes that these cover 80 percent of the market in the Federal Republic of Germany. For some application areas of robots, there already exist clear market leaders.

SCIENTIFIC AND INDUSTRIAL POLICY

FRG GOVERNMENT-INDUSTRY COLLOQUIUM URGES EUROPEAN COOPERATION

Frankfurt/Main FRANKFURTER ALLGEMEINE ZEITUNG in German 15 May 84 p 4

[Article by Klaus Broichhausen: "Approaches to Development of New Technologies--Genscher Advocates European Industry Federations"]

[Text] Bonn, 14 May. The foreign minister has devoted much time discussing close economic and technological cooperation in Europe in a Foreign Office colloquium with industrialists, scientists, politicians, and bureaucrats. Genscher strongly favors a joint developmnnt of new technologies by European industries. Genscher even went so far in his demands as to call for the creation of European industrial federations for the production and distribution of modern technology. What Genscher demands is difficult to achieve. Competition must not suffer as a result of new industrial conglomerates which would span international borders. Besides, joint development is not all that simple. As seen by Von Sanden, a member of Siemens' board of directors, there is considerable danger that such joint ventures would fail.

Censcher makes himself an advocate of a balancing act with new technology. Bonn would like to know the reason for the foreign minister's involvement in this matter. Other departments are watching these Foreign Ministry activities with raised eyebrows. Wouldn't the Ministry of Research and the Ministry of Economics be better suited as moderators for a discussion of economic and technological cooperation in the European Community? The initiative in the Foreign Office originates in the planning staff. Its head, Seitz, has been responding for a long time to questions relating to the technological challenge. Seitz maintains that the Foreign Ministry must participate in these discussions. Foreign Ministry under Secretary Lautenschlager expressed this in the colloquium as follows: At the threshold of a new technological development one must be on the right track for the future. These are not merely questions of economics, research policies, or social matters. According to Lautenschlager, a new jointly developed technology would also be significant for European and for foreign policy.

The Foreign Ministry is thus faced with the following question: How can Europe retain its rights as an equal partner in the American-Japanese-European triangle? The position of the Europeans can be weakened because

in the development of new technologies they lag behind the Americans and the Japanese, whether in the area of microtechnology or biotechnology. To catch up is important to avert dependence on the United States and Japan. This would not imply abandoning a cosmopolitan orientation. The European Community must certainly pursue free trade, but it must also safeguard its own production capabilities in key technologies.

As expressed in the colloquium, the ability to compete will have to be strengthened by "introducing the European dimension." Development of technology achieved through a European division of labor could reduce costs. By joining forces, as Genscher asserts, the rate of development could be accelerated. According to Genscher, Europe could assure its equality vis-a-vis the United States and Japan by staying technologically abreast. Lautenschlager holds that joint technological efforts are necessary for Europeans to maintain their global political and economic clout.

However, the prerequisite conditions for European collaboration must still be created. Nasko, a member of the board of directors of the Nixdorf Computer AG, demands that Europeans prepare for this cooperation by standardization and uniform licensing prodedures. He considers the current conditions for cooperation so inauspicious because Europe is like a rag rug. The most telling example for this: Nine European countries have simultaneously developed digital communication systems. Division of labor is to be promoted by governments and by the Brussels Commission. Count Davignon, Commission vice president responsible for industrial policies, commented self-critically at the Foreign Ministry colloquium that the European Community must not repeat the error of overregulation. Agreeing with the Bonn policy, Davignon favors a governmental and supra-national approach by creating basic conditions conducive to a smoother development of economic and technological cooperation. Professor Feld, director of the Institute for the German Economy [Institut der deutschen Wirtschaft], expressed the fear that the Commission would not be content with participating in the creation of an improved environment. He said that the European Community should not concoct technological programs. If, furthermore, the Community were also to propose specific projects and products under the rubric of industrial policy, nobody would any longer find his way through the maze of political support for technology. Davignon stated that it was important to stimulate cooperation, but that money was not the main issue. The European Community could support member states in their promotional efforts in order to create an improved environment for entrepreneurial endeavors.

Davignon is sufficiently optimistic to claim that Europeans, collectively, have everything they need to be competitive in the international market. Davignon leaves no doubt that Europe can counterpoise the state of technology in the United States and Japan. Davignon has this formula for the future of Europe: "To convert Europe's potential to Europe's added value."

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NEW STRATEGY, LEADERS GUIDE MAJOR THOMSON REORGANIZATION

Paris L'USINE NOUVELLE in French supplement to No 15 of 12 Apr 84 pp 72-76

[Article by Alain Pauche]

[Text] The organization chart has one pedagogic virtue. It expresses, more truly than one might think, the reality of the enterprise. Its structural as well as its functional plan. But though management staffs often deride a representation that sets forth a system of relations and powers, the fact remains that it can upset and at times bowl over an organization that has become familiar.

For the past 18 months, one of the top French enterprises (112,000 employees and 50.2 GF [billion francs] of annual revenue) has been engaged in a vast "structural adjustment," as it is termed by the firm's president, Alain Gomez, who is anxious to situate the restructuring of the group within the contextual, and least controversial, frame of reference of international competitiveness.

This somewhat stilted term actually conceals a reorganization--and a taking in hand--of an industrial group, an operation the scope of which has not been equalled in France in the last half-dozen years or so. A restructuring that, launched in the wake of the nationalization, is transforming the group. The proof? The two representations of Thomson are no longer superimposable. The 1982 organization chart, which is of the horizontal type, has been simplified under a new "galaxy," under which the group has been operating for the past several weeks. Thus, Alain Gomez's Thomson no longer resembles that of its founder, Paul Richard, nor that of his successor, Jean-Pierre Bouyssonie.

The Thomson reorganization is exemplary. The lessons to be drawn from it are of interest not only to the giants and to the management staffs of firms having more than 50,000 employees. Who is the head of an enterprise, the manager of a plant, who can affirm that he will never be confronted by a situation requiring a restructuring? If the Thomson case is exemplary, it is because of the scope of the change involved: Transfers of activities; reorganization of many of the divisions of its consumer products and

professional equipment branches into subsidiaries; reduction of staff in headquarters services; and concentration of functions at top management levels. It is also exemplary because of the methods involved, which, after the event, can be analyzed.

1. A Boss Who Commits Himself to the Task

The restructuring of a group rarely takes place on its own. It is given its initial thrust by one man, then directed by a small team of men. This is the first lesson offered by the Thomson restructuring: The controlling team is the stronger and the more impelled by the soundness of its "fight" for having been recruited from outside the group and for the specific and priority purpose of restructuring.

When Alain Gomez was appointed president of Thomson-Brandt, the parent company of the group and since named Thomson S.A., he looked for supporters to assist him in taking control of the group he presided. He found some. In particular, within the Consumer Products Division headed by Jacques Fayard. However, to strengthen his control he needed "new men." "His men," it is said within the group headquarters with a suggestive air of knowing more about things than is being said. "New men," responds Alain Gomez, who knows from experience that, alone, he will not be able to rapidly change a group that comprises several cultures, attaches itself to its history and justifies its failure to adapt by invoking the complexities inherent in its markets.

This is why he is relying on new management team members who have recently entered the group or whom he has just recruited, and whose professional past and profile can be interpreted as premonitory signs of an openness to change.

2. A Close-Knit Management Team

To merge the molding of men with the molding of structures, one's signals must be conveyed at the proper time. The result of propagation is immediate, its effectiveness is assured. "They frequently breakfast together, and all three of them are seen together with each other a great deal," confides unsmilingly a middle-management "politico," an attentive observer of the microcosm that is the head office of the group.

The profile of the men who have fashioned the new Thomson, in fact, reveals a great deal concerning the objectives being pursued by the president: Turn profitable, decentralize, unify and manage ("Unbelievable! Gomez wants to head Thomson," was the derisive comment making the rounds within Thomson-CSF [Thomson-General Wireless Company] only a year ago).

Three men comprise the hard core of Alain Gomez's top management team. They are Noel Goutard, Christian Aubin and Pierre Cabanes. They were all appointed under the same formula: Put into the key spots competent men whose charisma and the force of their convictions top all their other qualities. Each

of them is fulfilling his role. Christian Aubin, heading finance, was introduced as the penny pincher. Thomson made sure this became known. Inside, the message was quickly perceived. As regards the outside, the watchword was: The state, as the firm's shareholder and supplier of capital, must perceive that austerity is in control. The second signal was high-beamed.

Initially, therefore, there was a close-knit group of men, sharing the same views and visibly devoted to the CEO [chief executive officer]. Next came the decision to change, to do it fast and to make it known. In short, it was a matter of laying things out, giving wide dissemination to a plan, and, equally important, testing reactions whose scope was not readily measurable. The reforming of structures and the conceiving of others that operate better render men humble... Everyone--less out of modesty than intellectual honesty or, more likely, so as not to undermine the effectiveness of the therapy--denies authorship of the new organization.

"There is no Goutard formula!" declares categorically the director of operations of the group. He adds: "There is no organization model. It is up to each industrial group to work out the structures needed to operate." In the view of Christian Aubin, "It is not a question of a complete plan within itself," but rather one of a putting together of ways and means. And Pierre Cabanes caps it: "A finely detailed plan? No way! Furthermore, there is no way a timetable can be laid down."

Pragmatism, in the leading of groups, is unquestionably a virtue. However, account must be taken of circumstances. In December 1982, no one could have imagined a unified Thomson group (even on paper) deployed around a holding company that controlled "sub-holding" companies organized by type of activity, with its CSF subsidiary divided up among two branches and a holding company (CGR [General Radiology Company]). And everything gravitating around a "sun" reduced to 350 persons (see charts [at end of article]). However, the structure adopted cannot come as a surprise. It is the product of the group's history and of the strategic thinking of leaders dedicated to clarifying, decentralizing, and laying down the main axes of development.

Defining a strategy means first of all defining one's business. "Ask one question-- just one--in an enterprise," says Noel Goutard. "Namely: 'What is your job?'. That is a difficult question. In fact, at Thomson, no one knew what to answer." It is tough... Yet, all management manuals have made the point and will make it again tomorrow, after hundreds of McKinsey, of Booz Allen, and of BCG [expansion unknown] consultants have diagnosed, then sold it: Namely, the two values that best explain the success of the big organizations. Those organizations are the ones that have identified the activities in which they are the most knowledgeable and that have placed the accent on action.

A specialty and initiative. There is no getting around these. Noel Goutard has done nothing other than put these two principles to work. Prior to that, his president had stated the case cold-turkey: Thomson was "the only electronics group in the world whose holdings were as widely dispersed."

3. A Complete Strategic Analysis

While the strategic analysis, which becomes the primary job of the heads of an enterprise during a period of technological convulsions, must be carried out speedily, it must be even more speedily transmitted. The way the message is transmitted is at least as important as its contents. Thomson had to sweat to convince those concerned of the correctness of its strategy as regards telephony (transfer to CGE [General Electric Company]). But it is the objectives that are the hardest to formulate. For they are solely the responsibility of the top management team; this, in fact, is the reason why, in some enterprises, these commitments are not officially revealed!

4. A Posted Plan

This is the fourth point of the Thomson plan: An X-ray of the enterprise read in the light of a firmly defended plan. This intermediate transparency between two organization charts, enabling each one in the organization to reposition himself or herself, must be known to all. Its simplicity can confuse. This is a risk Alain Gomez had to run. For Thomson, it was true 6 months ago, and it will be true 6 months from now: Its plan is to become a European giant in consumer electronics, a world giant in electronics for professional use, and a giant by way of proxy in civil telecommunications. That tells it all: The enterprise's developmental axes and the cession of its telephone activities--but on its own terms--to CGE.

5. Selective Preparations for Actions

The fifth point is more prosaic but must nevertheless not be neglected. The preparation accorded to actions is of primary importance. The restructuring of a group--disengagements of activities, reorganizing activities as subsidiaries, thinning of head office and central services staffs in Thomson's case--cannot be accomplished "cold." Thus, the announcement of the group's losses in April 1983 (2.2 billion) of the 1982 fiscal year served as an electric shock treatment. First shock: "Our losses cannot be reabsorbed without an effort by all." Second shock: "The purpose of the restructuring is to allow the fight not to be slowed by the complexity and weight of our structures, as this would jeopardize our return to profitability in 1985."

This dialectic sequence can be criticized but it cannot be refuted. Gerard Locoz, CFDT [French Democratic Confederation of Labor] representative on the Thomson works council, was outstripped. The methods used to "put through the messages concerning the restructuring and the abandonment of activities had never before been used within the group," he points out. His serenity is understandable: The Thomson reorganization is not synonymous with elimination of jobs.

6. A Permanent Dialogue at All Levels

It can never be repeated too often: The important thing is to dialogue, to convince. "You have to get involved, take under advisement the valid reasons for disagreements and, above all, involve all the personnel in the step you are about to take," says Noel Goutard. The managing director of the group cites the reductions in headquarters services staffs, the most delicate operation in the restructuring. These staffs are in the process of being reduced gradually from 1,800 to 350, and later to 300, persons.

This "profound malady," which in 1983 cost Thomson 1.8 billion francs, or 3.6 percent of its annual revenue (taking the management and headquarters services staffs, numbering 3.100 persons, all together), afflicts many enterprises in Europe. The cause of this extra fat is simple: Headquarters staffs have grown beyond measure because group headquarters' functions have been increasingly overlapped by those of their respective branch headquarters. "Examples of duplicative functions abound: Services, statistics, audits, procedures. I had armies of accountants who thought they were working for me!" says Christian Aubin.

This headquarters weight-loss therapy, which is about to be completed shortly, has been an ordeal. Obviously as much for those who have been affected by it in the group's enterprises and must leave Paris to move nearer production or operations centers, as for the "restructurers," whose argumentation must be solidly buttressed.

The problem is: How to avoid double talk. How to convince each manager and chief of service, individually, of the soundness of an operation the object of which is to beef up the operational units, hence thin down the headquarters services, and at the same time demonstrate to the headquarters personnel that your intent is not to eviscerate. How to shelter the enterprise from the syndrome of terror that accompanies every restructuring.

Such questions often remain unanswered: It is easier to collect remarks than to harvest advice. Thus, the manager of a large subsidiary deplores being "somewhat lost" when he visits the group head office. And a former official of the group complains that "A hatchet was used."

7. Assert Management's Presence

Thomson's new management does not deny the difficulties it had to confront. It refutes the accusation of brutality. Avoiding the stereotyped phraseology so often resorted to by top managements when the weather gets rough, the leaders of the Thomson group are paying particular attention to two conditions they must fulfill for success. First, they must be able to demonstrate that operational management emanating from a head office can only be ineffectual. Secondly, they must lay down the principle that the functions of the top management of a group are those of strategic planning, management control, and the control of human resources, of the management of state participation and social matters. And will it want nothing more? As summed up by Pierre Cabanes: "To each his missions."

While it is an ordeal for all, a head-office-staff-reduction operation can provide the opportunity for enterprises to throw the spotlight on their priorities. Those they accord to productive investment and to operational self-sufficiency, for example.

But demagogy is not always worth the effort. At plant levels, the slimming down of head offices is popular. Now quite often, what is involved is a regrading of staff personnel, a reevaluation of functions--personnel matters, law, finance--that a group run by engineers has a tendency to neglect. A reevaluation, yes; loud talk of a "clean-up," no!

Certain actions are easier to "sell." One of the problems the group had to resolve was that of the coordination of accounting procedures. "We had to extricate them from their gaseous state," says Christian Aubin, "and make each and everyone fully responsible for his or her balance sheet." These account-auditing procedures had a rather beneficial effect. Close to 1,000 members of middle management and supervisory staffs were assembled in the form of small groups over a period of 8 months, resulting in the running of "240 accounting units through the shredder."

This is another lesson to be learned from Thomson: While restructuring actions can be carried out independently of each other, their effects are convergent.

We must not forget that one of the objectives, from the start, was to insert services of an operations nature in the "subsidiarized" enterprises and shrink the functions of the head office.

8. Match Actions to Words

Just as the "policy line" must be clearly stated, the logic of the "subsidiarization" must be borne out. "Does the enterprise actually have the means to put its new policy into effect?" was the question being asked within the group only a few months ago. Christian Aubin's response: "The game has to be played through to the end." Thus, TGP [Thomson Consumer Products], a holding company that has taken over the assets of the former "durable goods" branch, was endowed with 2.5 billion francs of capital of its own. A restructuring is not a poker game: Sooner or later, the message must be stated and the policy justified. In short, the enterprise must match its actions to its words!

The example of TGP was not fortuitously chosen. The fundaments on which it rests were equally well chosen. Beware, however, of the words that preceded it! If they dealt with TGP's financial self-sufficiency, and the intent is to demonstrate the group's desire to amply fund it, the example is a sound one. If, on the contrary, it is meant to prove the soundness of the decentralization involved, the example of the TGP is no longer the most appropriate. Jacques Fayard did not await the coming of Alain Gomez to achieve self-sufficiency!

One can easily be caught in his own trap: The reorganization, which is also an invitation to those concerned to change their ways of doing things, can be rejected or stifled. Even the best prepared of reforms risks failure at the joint ramparts of conservatism and skepticism.

9. Highlight Specimen Operations

Thomson appears to have got around this obstacle. The "subsidiarization" of the former Data Processing Headquarters, which has become TIS [Thomson Data Processing Services], a data-processing consultant firm, was systematically exploited. Today, TIS is no longer the sole supplier to the units of the group. "It is now required to earn a portion of its annual revenue from sources outside the group, hence to offer competitive services," remarks Christian Aubin. The "message" was pounded in. A happy turn: The management of this firm, which has an annual revenue of 300 million francs, says it now feels "freed."

No unnecessary talk, but rather cases that illustrate intended further actions. Convinced of the pedagogic value of cases, Thomson's top management has nevertheless not been spared criticism. The "professorial" aspect of its approach is cited as being "a three-part course." Not necessarily only by the grumblers. Others complain of delays in being informed. Major decisions, like the turning over of its telephony activities to CGE were, in fact, dsclosed by L'USINE NOUVELLE. "Less rhetoric, more information!" protests a CSF engineer.

He didn't know how right he was. But it took Thomson more than a year to make the change! "There was no point in time 'T' at which the restructuring was to be completed," confides Pierre Cabanes. "The group was transformed little by little: 'Subsidiarization' of Brandt, creation of a holding company, reorganization of the headquarters servces, startup of the conversion of the 'communications' branch into a jointly-owned CGE-Thomson subsidiary." At each step, the information office was given the task of explaining the group's policy. But the explanation was at all times held by the head office to be more important than the final result that would be achieved. Once, of course, the overall objectives had been defined and understood by all.

10. Re-Situate the Action Within the Overall Plan

Furthermore, adhering to an empirical procedure, Thomson only disclosed its objectives one by one. What it lost in the initial impact it gained back in the duel that followed, in that, this enabled Thomson to assert that each and every one of its objectives, taken separately, was important! The latter is no exception to the rule: Thomson expects each of its new subsidiaries to be able to find in the financial markets the funding it needs for its own growth. To be able at all times to re-situate an action consistently within the frame of reference of the overall plan is a prime requirement. "It provides opportunities to convince some men who are believed to have become imbued too soon with certain principles of management," remarks one consultant.

A method of persuasion such as this poses risks. Despite the precautions taken, Alain Gomez was accused of using the "subsidiarization" approach as a preparatory step toward massive divestments. The reasoning? A company is easier to sell than a division. Jean-Daniel Pigasse, head of information, did everything possible to emphasize, through company publications, that certain subsidiaries in deficit are neither more nor less "threatened" than are the divisions of Thomson-CSF that are in deficit. The result: Several weeks of agitation and troubled spirits. All the more troubled in that it was definitely among the intentions of the group to sell SODETEG [expansion unknown], already "subsidiarized"... Thomson subsequently gave up the idea.

Publication of its new organization chart is rarely the uppermost thought in the mind of the enterprise. In fact, the chart did not take on its definitive form until last January, after the constituting of the Thomson SA holding company.

The alchemy is curious: The closer one gets to the final result, the less the need is felt to focus on it. "A structure is meant to provide specifically for better management, swifter reaction, and more effective results," says Noel Goutard. "We must constantly gauge our performance against that of profitable groups of the same size if we want to show profits in 1985." In short, the actions themselves of changing, of adapting to the marketplace, of comparing one's performance with that of one's competitors and of modeling working-accounts are more important than the results.

"What is important," says Roger Crepin, CEO of the new subsidiary Brandt Armements (annual revenue 1.2 billion francs) and 35 years with Thomson, "is not so much the structures, but rather groups of personnel working together."

In a complex restructuring operation, nothing can be neglected that one might think is insignificant. It is a realm where signals reign supreme. Reactions, moreover, must be neither underestimated nor overestimated. The managements of enterprises, however, as we have seen, are not altogether resourceless. There are methods, lines of conduct, some simple, others less easy, for transforming and gearing up enterprises. All of them offer a means of responding a little better to the central issue, namely, that of adapting structures to the imperatives of efficiency and profitability. With the hope of avoiding pitfalls. But one can also touch wood!

[Boxed insert p 75 follows]:

How to Inform

Throughout the "hot" phase of the reorganization, the group's information services were mobilized. "The demand was very heavy," says Jean-Daniel Pigasse, manager of information. "But today, it is just a matter of fine-tuning and of giving wider circulation to the information." The panoply of available means for conveying information is, of course, important. The

CEO's desire to broaden the involvement of the personnel in the future of the group, however, is unquestionably much more so. The communication and information service's was touched to the quick!

The pivot of the group information drive was THOMSON HEBDO. Printed on yellow paper and 1,000 copies, this publication informs the group's management staffs regarding the group as a whole. The second medium: The telephone. A telephone bulletin is prepared twice a week. On Wednesday, everyone submits his or her questions; the responses are given on Friday. Frequency of calls: 1,200 to 1,500 a week.

INFORMATION THOMSON, printed in 30,000 copies and circulated to 23,000 management, supervisory and similarly classified personnel, explains the group's policies. It is delivered to the employees' homes rather than to their place of work within the enterprise. For "major events" or events judged to be so, video cassettes are recorded and distributed. Two other information letters are prepared: SOCIAL INFO, for the families of the personnel, and LA LETTRE (published in French) for foreign customers. The daily press summary, until now widely circulated within the headquarters, will henceforth go only to members of top management.

[Captions under photos follow]:

[Photo p 74 top left]: The "Restructurer": Noel Goutard, 53, began his career in the United States as a financial analyst before "returning" to Pricel together with Jerome Seydoux. His image: That of a business strategist and rebuilder who discovered the strategic importance of this specialty at Schlumberger with the Meter Company. As managing director, he has been in charge of operations since his entry into the group in February 1983. The Number 2 of the group (his unofficial title) is handling the restructuring. He also heads the group's "industry" and "engineering" activities. (Thomson Cuivre, Brandt Armements, SODETEG, Thomson-Lucas, etc).

[Photo p 74 upper right]: The "Old Eagle Eye": Christian Aubin, 50, inspector of finances, financial director of Thomson after having held the same position for 6 years at Schneider, is heading the restructuring of financial and accounting responsibilities and the setting up of rules of consolidation and management control common to the entire group. He is the financial watchdog, the "Old Eagle Eye." Christian Aubin is applying himself to the laying down of the responsibilities of all the managers, while at the same time untangling "the jumble of divisions and subsidiaries."

[Photo p 75 top left]: The "Legal Father": Pierre Cabanes, 45, legal counsel to the Council of State, former Labor Ministry representative for employment matters in 1980-1981, and a schoolmate of Alain Gomez at the ENA [National School of Administration], was recruited to handle social and juridical matters. Pierre Cabanes is the group's Number 1 for social matters. He conducts negotiations with the representatives of the personnel to "ensure the operation of the public sector democratization law in the enterprises of the group." Pierre Cabanes is credited with being the architect and "Legal Father" of the reorganization.

[Photo p 76]: Roger Crepin, 63, graduate of the State School of Arts and Manufactures, CEO of Brandt Armements, has experienced the transformations of Thomson from the vantage point of his position with Brandt. The reorganization of the group? "I have always felt the weight on my shoulders of the freedom that has been allowed me. Today, Thomson is trying to become a group. We are going to have to turn more towards it."

[Two organization charts follow, comparing the old Thomson structure (first chart) with the new one (second chart). They are accompanied by the following explanation]:

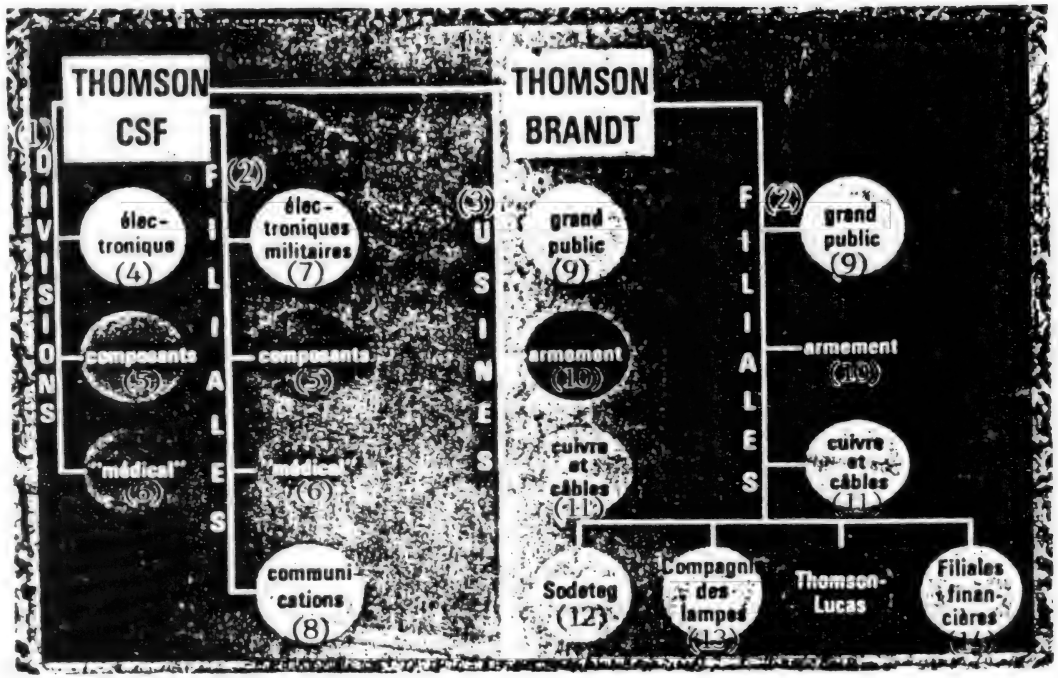
From the Old Thomson...to the New

The rationale underlying the Thomson reorganization is clearly brought out by a reading of these two very simplified organization charts. Until now, Thomson-Brandt and its principal subsidiary Thomson-CSF have exercised direct control over plants (Brandt) and divisions (CSF) at the same time that they also controlled subsidiaries. The reorganzation has consisted of identifying product-line specializations (organized as branches), converting the maximum possible number of divisions into subsidiaries ["subsidiarizing" them], and grouping subsidiary firms around Thomson SA, the group's new hub.

Thus, the plants and consumer goods subsidiaries are grouped into new entities that are brought together under a holding company named Thomson Grand Public [Thomson Consumer Goods]. Thomson CGR, formerly a part of CSF, is now a subsidiary. In these two branches, the lapping between the juridical and operational structures has been completed. It is not in place yet within the "CSF lineup." The next stage: Thomson Composants [Thomson Components] will be raised to the rank of a Thomson SA subsidiary; within a year, nothing will be left of Thomson-CSF--a prestigious trademark that will be retained--but its military activities (Equipment and Systems Branch).

Worthy of note: Thomson Telecommunications is not a part of this simplified diagram. CGE has taken over Thomson's "telephone" activities. Two other groups of subsidiaries have also disappeared: Those of the Light-Bulb Company and of the finance companies, which were ceded in 1982 and 1983.

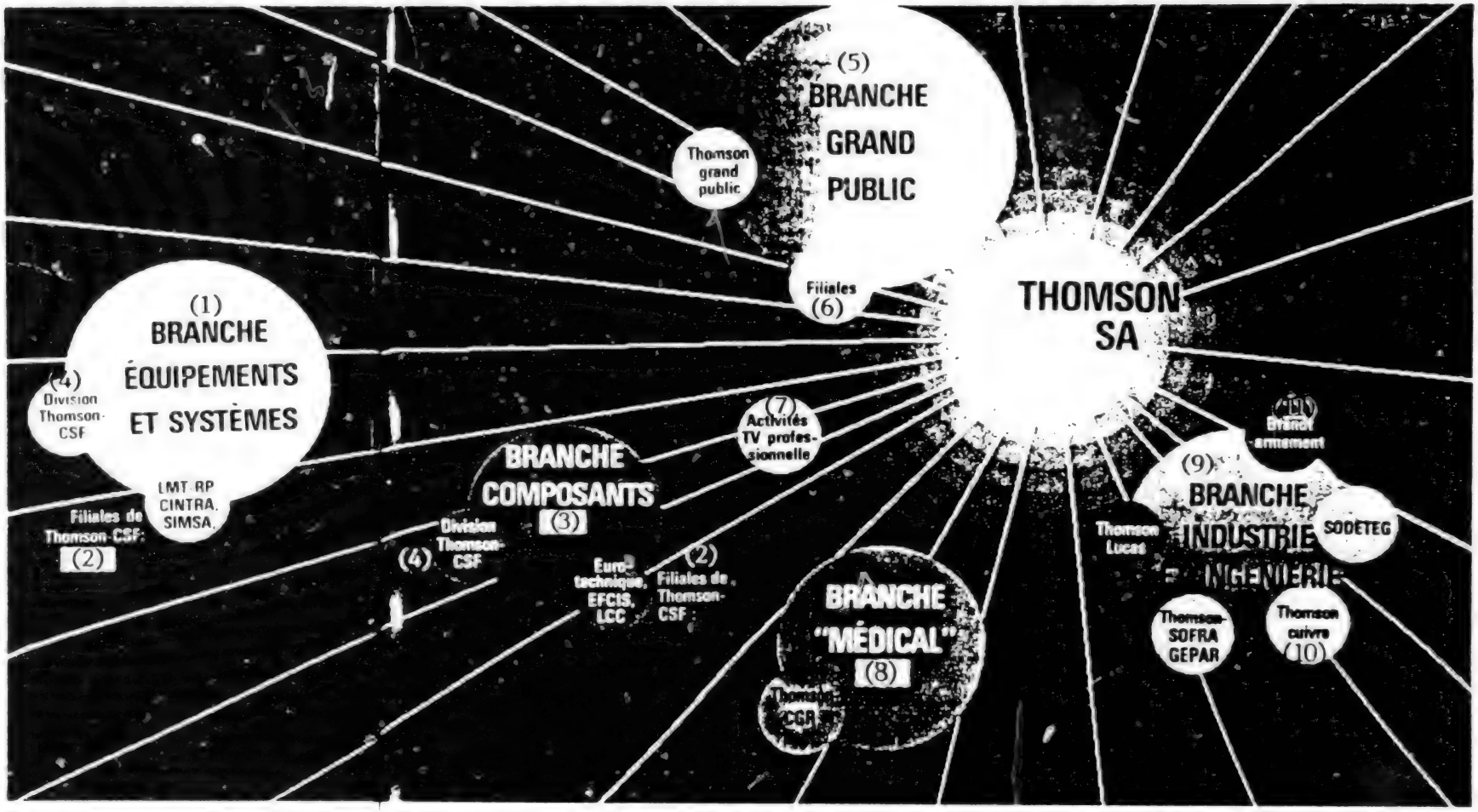
Former Thomson Organization



Key:

1. Divisions.
2. Subsidiaries.
3. Plants.
4. Electronics.
5. Components.
6. Medical.
7. Military electronics.
8. Communications.
9. Consumer goods.
10. Arms.
11. Copper and cables.
12. SODETEG.
13. Light-Bulb Company.
14. Subsidiary finance companies.

New Thomson Organization



Key:

1. Equipment and Systems Branch.
2. Thomson-CSF subsidiaries.
3. Components Branch.
4. Thomson-CSF Division.
5. Consumer Goods Branch.
6. Subsidiaries.
7. Commercial TV activities.
8. Medical Branch.
9. Industry and Engineering Branch.
10. [Thomson Copper].
11. [Brandt Arms].

FRG BEEFS UP MATERIALS, INFORMATION TECHNOLOGY

Duesseldorf VDI NACHRICHTEN in German 4 May 84 p 2

[Article by (gha): "New Horizons for Large-Scale Research: Government Asks Stronger Orientation to Economy's Needs"]

[Text] The 13 large-scale research institutions in the Federal Republic are to focus more on "users" needs, particularly those of the economy. Most of them are presently in the process of reorganizing the content of their research programs. They are now receiving considerable impetus for this from a report titled "Status and Perspectives of Large-Scale Research Institutions," prepared for the government by the Ministry for Research and Technology. In it, there is also a call for the research centers to become more closely involved in the programmatic reorganization of the federal government's research and technology policy.

Information technology, biology, materials and environmental research are to be strengthened because of their "function as bridges" to future applications. After the gradual slow-down of most nuclear engineering programs, the Juelich Nuclear Research Facility, for example, is addressing its non-nuclear research to the efforts on behalf of a "second network" of the environment-friendly use of fossil energy cources by utilizing heat from high-temperature reactors. Furthermore, a new research center is being housed there for basic technologies of information science based on the principles of sold-state physics which will complement the work of the St. Augustine Society for Mathematics and Data Processing. Finally, the Nuclear Research Facility wishes to open wholly new perspectives for combined large-scale research with the planned large-scale unit known as the Spallation-Neutron-Source (SNQ). This unit will aid in the study of complex cooperative phenomena in interlinked, non-linear multipartite systems to help solve synergistic problems of, for instance, climate research, ecology, the properties of "unconventional" materials or even modern economic science.

According to the government's plan, several large-scale research institutions are to cooperate in forming a center for materials research. Biotechnology is to be concentrated in Brunswick with the Society for Research in Biotechnology. The report does not state definitively, however, that the corresponding departments at the Nuclear Research Facility should be

The German Aerospace Research and Experiment Institute is being involved considerably more than before in the reorganization of the administration's space program. The government also expects the large-scale research institutions to become more strongly engaged in the program "For Health" with a "new" biology of the environment that traces harmful effects to common principles.

The report also calls for additional capacities in the centers for the purpose of technology assessment, cause-effect research and systems analysis. This is intended to provide an "early-warning system" that will identify promising fields of technology at an early stage, assess long-term effects of new techniques and offer alternatives for action. With the exception of some new large-scale equipment for basic research, there will be no additional government funds for the new tasks. Instead, resources are to be freed through restructuring measures in and among the centers. The Ministry for Research and Technology promises assistance to the institute directors and the coordinating Association of Large-Scale Research Institutes in cases where they need greater authority.

Closer cooperation with industry is expected to result in more funds as industry sheds its cautious attitude toward the services offered by the large-scale research institutions. In planning large-scale projects--and here the government clearly states its right to a voice--industry is to be involved from the earliest stage. In future, strict standards are to be applied in performance evaluation, and this will furnish the criteria for allocating resources in the form of staff, equipment and funding to the various institutes.

In its report, the federal government stresses that the large-scale research institutions should abide by the principles of subsidiarity and specialization and should undertake only those assignments which are consistent with large-scale research and which could not be handled just as well in other institutions.

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CSO: 3698/445

FRENCH GUIDE TO SEARCHING BIOTECH DATABASES

Paris BIOFUTUR in French Apr 84 pp 25-35

[Article: "Databases and Biotechnology"]

> [Text] What can we expect from databases, what are they and how are they to be used? Answers to these questions will be found in this essentially practical review that will serve as a guide in documentary information retrieval.

In biotechnology as in other fields, it is true that being well informed is a prerequisite to any decision, any action. Biotechnologies have been expanding so rapidly and their applications are so technical and so varied that libraries are no longer adequate to provide answers to questions in this field. Databases throughout the world have become a privileged tool in making decisions.

The mobilization program, which is based on some conclusions of the Douzou report, lists French shortcomings in this field and calls for the creation of a French specialized biotechnology database. Yet, several databases already exist. Some cover very specific fields such as enzymology. Others deal with broader sectors, such as pharmacy, nutrition, agronomy which, being already covered, sometimes by considerable databases, cannot be neglected.

The first commercial computerized database was created in the United States in 1962, as a result of the information explosion of the 1960's. Conversational document retrieval was used for the first time in the United States in 1972 and in Europe in 1974. Since then, the number of databases has kept increasing and there are more than 2,500 of them today.

What is a Database?

The words "database" and "databank" are still both used today, but the present trend is to adopt a single term to cover the concepts that used to correspond to these two words. We shall therefore use the word "database" [in French: "banque de donnees"] since this word is now generally used to refer to a computerized file or group of files giving access to the information one is looking for, using selection criteria that have been defined beforehand.

Access to information can be direct or through references identifying the information looked for. It is thus possible to distinguish between databases in the strict sense of the word and bibliographic databases. Depending on the nature of the data provided, data bases in the strict sense of the word will be:

- text databases providing full-length texts;

- factual databases providing descriptive data: addresses, indices, physical and chemical properties, nucleotide sequences;

- numeric databases which then provide series of numeric, physical or economic data that can be used and handled by auxiliary programs.

Bibliographic databases provide more or less complete document references. We then have descriptive reference databases whose object is solely to "refer" to the publication, thus making the user aware of its existance, and analytical reference databases which, in addition to the traditional catalog index card, also provide a more or less detailed analysis of the document contents in the form of an abstract.

Who Does What In Databases?

The data production-distribution chain consists of several functions carried out in succession by various organizations.

Upstream, the "producer," who sets up the database. He is in charge of creating the file. He is responsible for the selection of the data that will be entered into the bank and for their quality. To a large extent, he is also responsible for the timely entry of the data into the bank. In most cases, the producer is not involved in the various operations dealing with access to the database; this is the job of a database service center which will store in its own computers several databases belonging to several producers. The service center manages the database and offers, in the commercial sense of the term, simultaneous access to many users. A number of related services are also offered, e.g. training periods, consulting services, selective data dissemination according to previously defined research profiles, private file management, etc.

The intervention of third parties is essential to give users access to databases. These are the carriers, which include the organizations managing telecommunication networks and the networks themselves.

Networks are essentially characterized by the geographic areas they cover. Access to French databases is possible through the switched network, i.e. the traditional telephone network, but above all through Transpac, the packet-switched network[1] installed by the General Directorate of Telecommunications for data transmission. European databases can be accessed through Esanet, the network of the IRS [Information Retrieval Service] server in Frascati, Italy, and through Euronet, which was created by the European Community Commission. Finally, access to U.S. databases is possible through the Thymet and Telenet networks.

Networks also differ through their technical characteristics, such as transmission rate, mode and type, switching type.

As an example, let us consider Transpac which gives access to computerized bases located anywhere in France, for at present no French user should find himself more than 100 km from a Transpac access point. The monthly subscription fee is F 30 or so, and we should point out that the distance between the terminal and the database service center does not affect communication costs, which vary solely as a function of the time spent and the number of packets transmitted. French database service centers now take care of billing for the Post, Telecommunications and Television Administration. Therefore, as far as the user is concerned, the use of Transpac is transparent.

How To Access Databases?

Several possibilities are offered to users, depending on whether they are individuals (students, teachers, researchers, journalists) or companies (small, medium or large) with greater or lesser requirements and means. Conversational access: the user, who has signed an agreement with the database service center is provided with a terminal and a modem and is given a personal password that will enable him to connect to one or several databases through telecommunications and retrieve directly the data he is looking for.

As needed, the user can also obtain various information storage media that he will utilize himself: for instance, magnetic tapes, microforms, reference bulletins.

Finally, there are a number of brokers, public or parapublic organizations (Chambers of Commerce and Industry, Regional Scientific and Technical Information Agencies, university libraries) or private firms which specialize in querying databases, in most cases in well-defined fields. The ultimate cost to the user is of course variable, depending on whether the organization is subsidized or not. The cost factor may discourage certain users from accessing databases. Aware of this cost-selection, certain databases offer preferential tariffs. Researchers in certain fields may receive grants from MIDIST [Interministerial Mission for Scientific and Technical Information]. Finally, some organizations will carry out individual research at very competitive prices.

What Price To Pay?

Several modes of billing are possible, the most common being the one using connection time as the main factor. In that case, prices range from F 350 per hour for some bibliographic databases to F 4,000 or so for certain factual or numeric databases.

Therefore, it seems obvious that querying databases is not something that should be done in a rush or haphazardly; rather, one should first go through some essential stages:

- Learning how to query databases, i.e. learning how to use retrieval software (Mistral, Orbit, Darc, etc.). All information retrieval services offer

training periods and proficiency courses. Tariffs range from F 800 to F 4,000 per day. These data, as well as the list of available databases can be obtained from information retrieval services.

- Finding the databases that best cover your field. Various directories are available; they are of uneven quality and size. Let us mention international directories, such as the Encyclopedia of Information System and Service, or national directories listing all data bases accessible in France, for instance the directory published by the National Agency for Scientific and Technical Research, and finally sectorial directories.

- Knowing about database structures: are hard-copy of thesauri or lexicons available, etc.

Biotechnology Databases

They are still few; some are already operational (Pascal, Telegen); others are being created (Badge, National Nucleotide Sequence Bank).

Bibliographic Databases

- Pascal, a French Operational Database

Available through the Telesysteme-Questel and ESA [European Space Agency]-IRS service centers, Pascal, the bibliographic database of the Scientific and Technical Information Center (CDST) of the CNRS [National Center for Scientific Research], inaugurated its specialized biotechnology section in January 1982. Prior data can of course be accessed through the database as a whole. Pascal-Biotechnology now contains 10,000 references and its future growth rate is estimated at 10,000 to 15,000 references per year.

This base covers all fields of biotechnology, from basic research, including genetics, to engineering sciences and patents. In addition to its on-line service, for which it now bills F 380 per hour, Pascal offers standard bibliographic profiles for 10 themes or so that are in great demand, for an annual comprehensive rate of F 600. In addition to its Pascal Section T-215 bulletin, it also publishes a hard-copy index in French and in English.

- Foreign Bibliographic Databases

- Telegen can be accessed through the ESA-IRS, Dialog and Dimdi service centers and is produced by the U.S. Environment Information Center. This database reflects economic and regulatory concerns and it also deals with technical applications and research in the biotechnologies, including genetic research on all living organisms.

It has been operational since 1980, contains prior data dating back to 1973 and analyses 7,000 sources (periodicals, conference papers, company reports, patents, etc.). On ESA-IRS, it costs $80 per hour. Through Telegen, the Environment Information Center is offering a series of services: monthly publication of recent article abstracts, procurement of primary documents, a telephone service providing the most recent data every week, etc.

- Biotechnology Abstracts produced by the Derwent Publication Ltd (Great-Britain) can be queried on SDC [signal data converter] for $100 per hour. More recent than the others (July 1982), this database covers biotechnology as a whole, with respect to applied research as well as production. It analyzes over 1,000 sources.

A Bibliographic and Factual Enzyme-Engineering Database: Badge

In France, the field of enzymology is covered by an original database called Badge, which is produced by the Enzymatic Technology Laboratory of the Compiegne Technological University. Deferred access to this database can now be obtained; the laboratory of the Compiegne Technological University is providing users with a tailored assistance service ranging from assistance in formulating queries to technical consulting services. The database covers basic and applied research on the immobilization of enzymes, microorganisms and vegetal or animal cell organelles. A retrospective study is now in progress. This database has a very special structure. It is both bibliographic and factual and processes texts in their entirety.

The CIDST [Committee on Scientific and Technical Information and Documentation] is considering a $10,000 project that would integrate Badge into a European organization, taking the Manchester University (Great-Britain) and certain manufacturers as partners.

Factual-Type Databases

These are essentially the so-called gene banks or nucleotide-sequence banks generated by the steadily increasing flow of data resulting from the development of research on nucleic acid sequences. These data must be computerized so they can be used by various programs both in basic research and in the development of potential biotechnological applications.

Historically, the first such base was Genbank, which was initiated late in 1979. The NIH (National Institute of Health) had received offers from various groups to create a data collection and analysis system. A cooperation with Europe was contemplated (European Molecular Biology Laboratory: EMBL). For administrative and budget reasons, the project experienced problems so that, in April 1982, the EMBL announced that it would go it alone. Following an invitation to tender, the contract for $3 million over a 5-year period was awarded to Bolt, Beranck and Newman (BBN) and subcontracted to the Los Alamos National Laboratory. The NIH, the National Science Foundation and the Pentagon contribute to this database. This new database, which was started on 1 October 1982, is managed by BBN, whereas data are collected and checked by the Los Alamos National Laboratory.

Genbank has in store 850,000 bases, i.e. over 1,000 DNA or RNA sequences of over 50 bases each, which were published since 1967. The time lag between the publication of a sequence and its entry into the base is of 3 months or so. This database is not yet fully on-line and, although it can be queried, the number of users is limited. The Prophet software used by Genbank confers it some originality, as it offers graphic and statistical-analysis capa-

bilities. Answer to a query can be obtained in writing or on magnetic tape (cost: $65). Genbank can also be accessed through Intelligenetic, a company that developed an information service on DNA sequences. Thanks to its Genet software, it is thus possible to compare sequences, map restrictive enzyme action sites and predict the secondary structure of the protein coded by the sequence considered.

These data are available in France through Infogem (La Defense, Tour Eve) for $18 per hour of connection, plus $25 per minute. Also note that training in the use of this complex software is offered for $500 per day.

- European and French Databases

As a result of increasing awareness in the strategic stakes of a biotechnological information policy, the third plan of action in the field of information and documentation (1981-1983) was adopted on 27 July 1981 by the EEC Council of Ministers. The CIDST, which is involved in this plan, created a working group: "Information on Biotechnologies." The projects selected by the group include the development of a genetic information organization around the nucleotide-sequence database produced by the EMBL in Heidelberg. This European project received a $50,000 subsidy. It should allow for cooperation between European sequence bases, Genbank and the forthcoming Japanese database. The partners agree on the project, but its gestation is hindered by the sensibilities and ethics of the various partners.

In France

In 1980, an already quite complex organization existed in Lyons; it had been created by the Molecular Development Institute under Professor Grantham. ACNUC [expansion unknown] included some 300 nucleic acid sequences of all kinds. This database, to which biologists, computer experts, mathematicians and statisticians were contributing, had the benefit of a software support based on biological systematics, which made it easier to access sequences knowing their biological characteristics and functions. In 1982, ACNUC included over 1,600 sequences that could be accessed by author, category of organisms, main sequence and subsequence. The increasing number of sequences resulted in material difficulties and a new development chart was proposed, with the assistance of the Ministry of Industry and Research (Mission on Biotechnologies and MIDIST). Thus, a national nucleic acid sequence database was created without withdrawing from the European project in which the EMBL is in charge of raw data acquisition throughout Europe, whereas ACNUC distributes the expertise. At national level, the originality of this database resides in the organization of raw data, which makes selection easy, the multicriterion of sequences, and in the existence of a cooperative-program database sponsored by a users' club.[2] This club was created in January 1982 and is an informal regrouping of various public research organizations (CNRS, INRA [National Institute for Agronomical Research], INSERM [National Institute for Health and Medical Research], INSA-Lyons [National Institute for Applied Sciences], Bordeaux and Nice Universities) and private companies. The database of the Bari center (Italy) will soon be connected to the Lyons database, thus contributing its data on mitochondrial nucleic acid sequences.

This database is stored at the CITI 2 [Data-Processing University Center 2][3] and should soon be accessible to the public. Thanks to the work of the Users' Club, over 20 programs have already been stored at the CITI 2. Most of these program will make it possible to access any of three types of files:

- EMBL sequences;
- the sequences of the Lyons Molecular Development Institute;
- sequences belonging to any given user.

These programs fall into five categories: sequence manipulation, structure programming, sequence comparison, aminoacid sequence translation, restriction charts.

- A Look At Japan

Japan expressed the wish to set up a sequence database at the Tokyo University. The Americans and Germans are interested: once language problems are solved, this project would enable them to include in their own bases the sequences published in Japanese scientific literature. As for the French, the Mission for Research and the CDST are currently studying the creation of a Japanese technology surveillance office. French producers will thus be in a position to increase considerably the contents of their databases. Cooperation with the German office, which was created in Japan two years ago, is also being considered.

Strain Banks

The demand for information on culture collections keeps increasing. Not only do these collections provide information on the genealogy and various characteristics of a given strain, but they also represent a genetic pool of essential importance. It must become possible to exchange and store information and to bring it up to date. The heir of the "culture collection section" of the International Association of Microbiological Societies, the WFCC (World Federation for Culture Collection) was created in 1970. It made it possible to prepare the first culture catalog in 1972. As computers had to be used to prepare this inventory, the World Data Center was then created at the Queensland University in Brisbane (Australia). A second edition of the catalog was made possible by the mass of new data thus stored and by a revised nomenclature. These are not databases in the previous sense of the term, but they do look rather promising, especially since the WFCC is cooperating with UNESCO to create MIRCENS (Microbiological Resource Centers). These centers are going to form the nodes of an international network of culture collections (See BIOFUTUR No 6). Finally, the WFCC is also cooperating with the European Society for Animal Cell Technology in creating a database specialized in microbiology. This database, MIRDAB, is being produced by Excerpta Medica (Elsevier Amsterdam). It received a $5,000 starting grant from the European Community. This is not an on-line database, but an inventory, the result of data-processing work. It contains all the information available on animal and vegetal cell culturs, microorganisms, viruses, phages, plasmids and other vectors as well as on genes. This database is calling for international cooperation so that, in time, it would have such a mass of data and they would be so diversified that preliminary screenings would no longer be necessary.

As far as European projects are concerned, on the one hand the CIDST is contemplating the organization of an international symposium on data networks for the European collections and, on the other hand, it is studying the feasibility of a computerized European database on these collections, for which it is helped by the Pasteur Institute and by Environmental Resources Limited (Great-Britain). It was given a $30,000 development credit.

The rapid development of hybridomes and monoclonal antibodies warrants the creation of a database. International cooperation in completing such a project appears to be more concrete than in other fields. Through the impetus given by Prof Alain Bussard, director of the Cell Immunology Unit at the Pasteur Institute, this database is being created in the context of CODATA (Committee on Data for Science and Technology), an offshoot of ICSU (International Council of Scientific Unions). This database will be organized along the same lines as the others: it will have to tell who does what. It is intended to be of practical utility, but critical as well; it uses the data-processing facilities of the NIH and receives many contributions from France, the FRG, Great-Britain, the United States as well as Italy, Japan, Switzerland and other countries. It will be located at the American Type Culture Collection.

The initial project is designed on a small scale. Requests will have to be sent to regional centers which will provide answers within one or two weeks. This service will become available early in 1984, pending on-line access.

Databases Not Dedicated to the Biotechnologies

These dedicated databases will certainly help you progress in your work. Yet, these databases alone cannot be expected to meet the demand of the increasing number of users of the biotechnologies. For that reason, it is interesting to review the major databases according to the fields covered. These databases contain a wealth of information concerning biotechnologies, although their initial goal is not to deal exclusively with this discipline. As new databases keep being created, it is difficult to present an exhaustive list.

Patent Databases

Multi-discipline and dedicated databases provide bibliographic notes which can be selected by querying the information field labeled "type of document." If desired, it is thus possible to select only patents dealing with a given subject. However, some databases specialize in providing this particular information.

The advantages of databases seem to be now well established. Properly used, they will make possible exhaustive research, data analysis, remote querying, and will permit considerable time savings. However, despite the increased availability of these databases, there does not seem to be as many users in France as in other European countries, not to mention the United States and Japan. It is true that prejudices are hard to overcome and some fear that strategic data may leak out of their engineering departments when databases are queried. We shall not try to assess the validity of such concerns, but

we do not believe that it is desirable to see a proliferation of competing databases. It would be far better to direct our intellectual and financial effort to the development of processing software that would add to the value of the limiting data already available internationally. In France, the MIDIST is trying to support initiatives of this type, which already exist in other fields. The future of databases is dependent on such software and on the construction of database networks. By adding complementary databases or databases tending to be complementary, high system performances can be obtained. Each database can have its own particular domain for internal use, but must be compatible with other databases, a condition which it is now sometimes impossible to fulfill.

For Further Information

Database Directories

- Directory of Online Databases. Vol 3, No 3, Spring 1982; Cuadra Associates, Santa Monica, 1982.

- Data Bases in Europe 1982. Directory of European Databases and Service Centers connected to the Euronet-Diane network, Commission of European Communities, Luxemburg, 1982.

- Databases and Databanks Accessible In the Conversational Mode in France. Directory established by the ANRT (National Technical Research Association) Paris, 1983.

- Directory of Database and Databank Producers established by GFPBBD (French Association of Database and Databank Producers), Paris, 1984.

- Directory of French Databases and Databanks, Melun Chamber of Commerce and Industry, Department SOS-Documentation, Melun, 1983.

- Guide to French Databases, by Subjects, published by the Database Information Center, Paris, 1982.

- Scientific and Technical Databases in the Field of Food Technology, by Cl. Avisse, INRA, Versailles, 1981.

Organizations

- CIBDV (Database and Videotex Information Center), 11, rue du Marche-Saint-Honore, 75001-Paris.

- MIDIST (Interministerial Mission for the Development of Scientific and Technical Information), 9, rue Georges-Pitard, 75015-Paris, Tel. 842.64.64.

Multi-Discipline Databases (B: Bibliographic Database; F: Factual Database)

Name	Type	Producer	Server	Volume	Field Covered and Characteristics	Cost/ Hour
Comprehensive Dissertation Index	B	University Microfilm International (USA)	Dialog BRS	750,000	Master's theses and others Doc I	$ 55 $ 15
EABS	B	European Community Commission (EEC)	Echo	25,000	Results of EEC-subsidized scientific and technical research programs	Free
NASA	B	NASA (USA)	ESA	1,146,000	All fields, including chemistry, biology and engineering	$ 40
NTIS	B	National Technical Information Service (USA)	ESA SDC BRS Inka Data Star	950,000	R&D reports from 200 federal agencies Doc I obtained from CEDOCAR [Armament Information Center]	F257 $ 38 $ 47 $ 47
Pascal and Pascal 73	B	CDST (France)	ESA Questel	2,600,000 1,700,000	Multi-Discipline	F380
Chemical Abstract	F and B	American Chemical Society (USA)	Questel ESA Data Star Dialog SDC BRS Pergamon Infoline	6,000,000	Covers chemistry as a whole (organic and inorganic chemistry) through published patents, congresses	$ 60 $ 56 $ 64 $ 68 $ 54 $ 52
DGRST	F	DGRST (France) [General Directorate for Scientific and Technical Research]	DGRST		French scientific and technical research described through laboratory research projects	Deferred access

Multi-Discipline Databases (Continued)

Name	Type	Producer	Server	Volume	Field Covered and Characteristics	Cost/ Hour
LABINFO	F	CNRS/ANVAR [National Agency for the Implementation of Research] (France)	Questel	4,030	Research in progress in facilities financed by CNRS, on all research subjects Information on public and private laboratories	F540

Agriculture and Agrifood

Name	Type	Producer	Server	Volume	Fields Covered	Cost
Agrep	B	EEC European Commission Host (EEC)	DIMDI	22,000	Research operations in agriculture and associated fields	$ 17
Agricola	B	U.S. Department of Agriculture (USA)	Dialog BRS	Increasing by 12,000 per month	Primarily vegetal production	$ 35 $ 32
Agris	B	FAO	ASE DIMDI	530,000	Agriculture in the broader sense	F410 $ 17
CAB	B	Commonwealth Agricultural Bureau (Great-Britain)	ASE Dialog DIMDI	1,208,000	Very broad field. National and international regulations from immunology, taxonomy, water resources, microbiology	F333 $ 50 $ 49
CRIS	B	Current Research Inf. U.S. Department of Agriculture (USA)	Dialog SDC	24,000	Research and research projects related to agriculture and carried out by federal organizations	$ 35
Fairec	B	Fruit and Vegetable Research Institute (France)	Questel	36,000	Tropical and subtropical crops	F350

Agriculture and Agrifood (Continued)

Name	Type	Producer	Server	Volume	Fields Covered	Cost
Food Adlibra	B	K & M publication General Mills (USA)	SDC	50,000	Specialized more particularly in new products and processes Patent analysis	
Forest Product	B	Forest Products Research Society (USA)	SDC	16,000	Forest and wood products Chemical analysis, industrial and economic aspects (patent analysis)	$100
FSTA (Food Science and Technology Abstract)	B	International Food Information Service	ASE Dialog SDC DIMDI	210,000	Contains research data from the producer and other organizations (essentially an anglo-saxon database)	F350 $ 65 $ 65 $ 65
Ialine	B	Information Center of the Industries Using Agricultural Products (France) Co-produced with Pascal	Questel	135,000	European coverage Co-production agreement with CNRS	F330
Paperchem	B	Institute of Paper Chemistry (USA)	SDC Dialog	163,000	Wood and cellulose by-products	$110
Pestoc	B	Derwent Publication (Great-Britain)	SDC		Plant protection (pesticides, herbicides, fungicides)	$100
Resagri	B	Resagri	Producer	200,000	Agricultural economy and financing Agricultural technology	F300
Agedor	F	INRA	Questel		INRA laboratory research	

Environment and Water

Name	Type	Producer	Server	Volume	Field Covered	Cost
AFEE	B	French Association for Water Study (France)	ASE	45,000	Water biology - Water treatment, effluents and pollution Water resources	
Aqualine	B	Water Research Center (Great-Britain)	ASE Dialog	30,000	Id.	$281 $ 35
Endoc	B	European Community Commission (EEC)	Echo		500 information and documentation centers on the environment	Free
Enrep	B	European Community Commission (EEC)	Echo		Environmental research projects in the EEC	Free
Enviroline	B	Environment Information Center (USA)	ASE Dialog SDC BRS	110,000 references	Environment, pollution, biology	F386 $ 78 $ 90 $ 75
Environmental	B	Environmental Studies Institute (California, USA)	Dialog	Since 1973, increasing by 2,000 per month	Environment, pollution, biology	$ 60
Pollution Abstract	B	Data (USA)	ASE Dialog SDC	77,000	Environment, pollution, biology	F328 $ 73 $ 65

Biology, Medicine and Pharmacy Databases

Name	Type	Producer	Server	Volume	Field Covered	Cost
Biosis	B	Biosciences Information Service of Biological Abstracts (USA)	Dialog SDC ASE DIMDI BRS Data Star	3,740,000	Life sciences, including genetics, virology, immunology	$ 58 $ 65 F320 $ 42 $ 52 $ 58
Cancerlit	B	National Library of Medicine (Bethesda) USA)	DIMDI NLM IMA in France	240,000	Cancerology	$ 17
Cancerlit	B	Gustave-Roussy Institute (France)	Questel	132,000	Chemical and experimental cancerology	F300
Chemical Exposure	B	Oak Ridge Information Center (USA)	Dialog	15,000	Biological properties of chemicals, toxicology, concentration of chemicals in human tissues	$ 45
Embase Excerpta Medica	B	Excerpta Medica Elsevier (Netherlands)	DIMDI Data Star Dialog	Increasing by 20,000 per month since 1974	Medicine and related biological disciplines, including hygiene	$ 52 $ 70
Inspec	B	International Information Service for Physics and Engineering	BRS SDC ASE IRS Questel INKA (FRG)	Increasing by 14,000 per month	Civil engineering through physics and medical biology	
Ipab	B	American Society of Hospital Pharmacists	DIMDI BRS Dialog	76,000	Pharmaceutical industry and products	$ 10.5

Biology, Medicine and Pharmacy Databases (Continued)

Name	Type	Producer	Server	Volume	Field Covered	Cost
IRL Life Science	B	Information Retrieval Ltd (Great-Britain)	BRS Dialog		Animal biology, biochemistry, genetics, microbiology	
Medline	B	National Library of Medicine (USA)	DIMDI Data Star Dialog BRS	3,750,000	Biology, medicine, chemical pharmacology, biochemistry	$ 21 $ 38 $ 35 $ 19
Premed	B	Bibliographic Retrieval Service (USA)	BRS Data Star	Since 1981 600 per week	Medical biology Medline genetics/veterinarian medicine coexisting with traditional medicine, immunology, hematology, biochemistry, immunology	$ 30 $ 63
Batech	F	Compiegne Technological University (France)			Industrial catalogues of biomedical and hospital equipment	Not yet available
Pharmsearch	F	Pharmsearch and INPI [French Patent Office] in 1984	Questel in 1984	80,000	Data classified by molecules This database will give a history of any product which is or could be of interest to the pharmaceutical industry	

Energy

Name	Type	Producer	Server	Volume	Field covered	Cost
Energyline	B	Environment Information Center (USA)	Dialog ESA SDC Inka	61,000	All energy-related problems including energy-saving technologies	$ 73 $ 90 $ 75 $ 75
FNEE	B	French Agency for Energy Expertise (France)	SEMITEL		New energies, including solar energy, biomass, etc.	F360

Regulations and Advertising

Name	Type	Producer	Server	Volume	Fields Covered and Characteristics	Cost/ Hour
Compendex	B	United Engineering Center	Dialog SDC ESA Inka Data Star BRS	1,018,000	Engineering	$ 80 $ 95 F500 $ 75 $ 73 $ 68
Noriane	B	AFNOR (France) [French Standard-ization Association]	Questel	32,000	French and European standards and technical regulations	F550
Technotec	F	Control Data (France)	Producer	20,000	Classified ads: offers and requests for technology from anywhere in the world	F500 per ad F700 per hour for a query
Telemaque	F	French Foreign Trade Center (France)	CISI [Int. Data-Proc. Consulting Company]		Foreign market data research Transfer/Imports/Cooperation	F450
Transinov	F	Office for Research on Innovation (France)		3,000 + 60/day	Transfer opportunities from French or foreign public or private laboratories	F550

Patent Databases

Name	Type	Producer	Server	Volume	Field Covered	Cost
Claims	B	IFI [expansion unknown]/Plenum Data Service (USA)	Dialog	1,000,000	U.S. Patents - Chemistry since 1950 - Other fields since 1970	From $300 to $ 95
INPADOC	B	INPADOC [expansion unknown]	Dialog Inka	8,500,000	Patent families in 50 countries since 1974 (1968 for some)	$ 95 $ 75
INPI 1	B	INPI [French Patent Office] (France)	Questel	500,000	French patents since 1969 Administrative, bibliographic and legal data No abstracts, no keywords	F550
INPI 2	B	INPI (France)	Questel	65,000	European patents Information contained in the European Patent Register	F550
INPI 3	B	INPI (France)	Questel	800,000	Patent families in eight countries since 1968	F550
INPI 4	F	INPI (France)	Questel		International patent classification - List of terms and codes included in the classification divisions and subdivisions	F550
Patente	B	INPADOC	BRS	560,000	FRG, Swiss, Austrian patents since 1978	$100
USPO - USPA [expansions unknown]	B	Derwent (Great-Britain)	SDC	800,000	U.S. patents since 1970 Bibliographic data, keywords Complete texts of claims	$100

Patent Databases (Continued)

Name	Type	Producer	Server	Volume	Field Covered	Cost
WPI [expansion unknown]	B	Derwent (Great-Britain)	SDC	2,000,000 recordings 5,000,000 patents	Patents from 24 countries classified by families Bibliographic data - Keywords Abstracts since 1981	$125
Patsearch	B	Pergamon International Information Corporation (USA)	Inforline	750,000	U.S. patents Associated drawings and chemical structures are stored on videodisks and can be obtained at the time of the search	£ 35

FOOTNOTES

1. Packet-switching: the message from one correspondent is broken down and (if need be) regrouped with other messages to form "packets" of a predetermined maximum size (expressed in number of bits).

2. Users' Club (F. Rodier), Jacques-Monod Institute, Tour 43, 2, place Jussieu, 75251-Paris, Cedex 05, Tel. 633.05.43.

3. CITI 2 (University Data-Processing Center), 45, rue des Saints-Peres, 75270-Paris, Cedex 06.

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1. Marx, B., "Initiation a l'utilisation des banques de donnees" [Initiation to the Use of Databases], Ministry of National Education, Directorate of Libraries, Museums, and Scientific and Technical Information, Paris, 1982.

2. Dore, D, Don, H., and Hassanaly, P., "Connaitre et utiliser les banques de donnees" [Knowing and Using Databases], published by Database Information Center, Paris, 1981.

3. Chaumier, J., "L'acces automatise a l'information" [Computerized Access to Data], Modern Publishing Company, Paris, 1982.

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